Choosing alternatives to coal tar-based pavement sealcoats: Guidance for property owners, associations and managers

From Minnesota Pollution Control Agency

http://www.pca.state.mn.us/index.php/water/water-types-and-programs/stormwater/stormwater-management/great-lakes-coal-tar-sealcoat-pah-reduction-project/choosing-alternatives-to-coal-tar-based-pavement-sealcoats.html

Safer alternatives

You should request a safety data sheet with clear ingredient identification and percentages. If a safety data sheet is not available, ask for more information or move to a product or supplier who offers one.

It is the buyer's responsibility to look at data sheets and talk to providers about key ingredients for protection and manufacturer's recommendations for optimal application.

Do not select products if their safety data sheets, container labels, or technical bulletins show the Chemical Abstracts Service (CAS) numbers 65996–93–2, 65996-89-6, or 8007-45-2, or the words "coal tar," "refined coal tar," "refined tar," "refined coal tar pitch," "coal tar pitch volatiles," "RT-12," "tar" or similar terms.

You may see coal tar/asphalt blends offered with as low as 10% coal tar content, but even at that level, PAH content is around 100 times higher than asphalt-based sealcoat. These blends should be avoided.

The most common and cheapest alternative to coal tar now on the market is petroleum asphalt-based sealcoat (CAS number 8052-42-4). Asphalt sealcoats contain PAHs, but at as little as 1/1000th the PAH level of coal tar sealcoats. Good asphalt sealcoat emulsions are very affordable, will provide a black appearance for 1-2 years, and can provide less-visible protection for 2-4 years if properly applied. They are permitted in locations with bans on coal tar.

Asphalt sealcoat data sheets may give ranges such as 10-30% for asphalt content, but ask for 30%. Polymer content of 2.5% to 5% aids drying, adds flexibility, and helps retain aggregate (chip or gravel) if you are applying a chip seal.

Other alternatives such as Gilsonite®, acrylic and agricultural oil-based seals contain few or no PAHs, but they tend to be higher-priced and they have less of a performance track record than asphalt seals. Even so, you should ask about these products and their effectiveness and cost as research and market conditions evolve.

More information

It is the buyer's responsibility to look at data sheets and talk to providers about key ingredients for protection and manufacturer's recommendations for optimal application:

- For asphalt fog seal-sealcoat products, look for the binder component (asphalt) to be 25-30%. Many data sheets will give wide ranges such as 10-30%, but be persistent in asking for better information and higher asphalt content;
- The asphalt emulsion for chip seals (with a layer of gravel) should be around 65% residual asphalt;
- For asphalt-based sealcoat emulsions, water content as supplied will be on the data sheet, and the manufacturer may also provide guidance on limits to the final dilution an applicator can do to aid in spraying or spreading. Be aware of these guidelines but recognize that applicators may still vary

dilution. The bottom line is that when cured, the sealcoat should have uniform coverage and appearance, with all aggregate and spaces between covered without gaps or pinholes;

- Polymers are commonly used in sealcoats but not essential. Rubbery polymers like styrene/butadiene, isoprene, or neoprene increase flexibility to stand up to extremes of heat and cold, and they help the sealcoat set faster which is essential when rain, cold or darkness are impending or in commercial parking lots where traffic needs to get back on the pavement as quickly as possible. If you need these properties, your asphalt sealcoat should contain 2.5 to 5% polymers. Note that many highway and road agency experts and purchasers specify a polymer-modified binder in fog and chip seals;
- Clay, mineral, quartz or similar materials add strength and are typically around 20% by weight;
- Carbon black, slate and other mineral additives will darken the coating (if desired);
- Not listed on data sheets will be sand, often added by a contractor at 3 to 6 pounds per gallon to fill a rough surface, or to provide traction to newer or smoother pavement. However, be aware that as the sealcoat binder starts to wear away, the sand released will cause greater abrasion under tires and accelerate the wear rate of the coating.

For larger commercial parking lots, chip seals with gravel are slightly more expensive than sealcoat with no stone but can last twice as long as an asphalt sealcoat with no gravel.

Gilsonite® sealcoats typically have some petroleum asphalt content, so will be another low-PAH option. However, they may also include naptha, mineral spirits or other solvents which may be a local regulatory (ground-level ozone or smog formation) concern. It is often recommended they only be applied on unsealed or asphalt-sealed pavement; not onto coal tar or acrylic-sealed surfaces. Gilsonite-based sealcoats may be more than twice the cost of asphalt-based sealcoats, but experiences vary on how much extra life they offer.

The no-PAH options include acrylic-based and agricultural oil-based sealcoats, and cement-based micro-layers. These are not as readily available as asphalt-based sealcoats, and there is less long-term experience or research showing how they protect and preserve pavement, especially for retail acrylics applied by homeowners. Even though somewhat higher in initial cost than asphalt-based sealcoats, professionally-formulated and -applied non-asphalt sealcoats may be worth considering in some applications.

There are links to a small sample of studies of no-PAH products at the end of this guidance, but with all the products and emerging research, look for pavement experts to help you stay current. Suppliers should contact the Minnesota Department of Transportation Office of Materials & Road Research for recommendations on testing new products.

With zero-PAH products, it is important that you accept some uncertainty about the longevity of the treatment. Get advice from more than one source with experience using these newer products, and make sure to follow manufacturer's guidance on compatibility with the surface and its condition, and rates of application. Improperly applied, they might ruin your pavement or reduce its life.

If one is offered at all, the length of product warranty can vary widely for sealcoats, whether store-bought or supplied by a contractor. For instance, one survey of asphalt-based retail products found that warranties varied from 1 to 10 years. Ask if a warranty is offered, get it in writing, and compare product claims whenever possible.